



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/817,559	03/26/2001	C. Theodore Peachee	3174-000003	7773
27572	7590	12/16/2003	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 828 BLOOMFIELD HILLS, MI 48303			GONZALEZ, JULIO C	
			ART UNIT	PAPER NUMBER

2834

DATE MAILED: 12/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/817,559	<b>Applicant(s)</b> PEACHEE ET AL.	
	<b>Examiner</b> Julio C. Gonzalez	<b>Art Unit</b> 2834	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-8,10-12,14-18,20-23 and 25-27 is/are rejected.
- 7) ☒ Claim(s) 3,9,13,19 and 24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
     a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                             | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>8122103</u> | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 6-8, 11, 12, 16-18, 21-23 and 26 are rejected under 35

U.S.C. 103(a) as being unpatentable over Tang in view of Takeuchi et al and Oki (JP 411289701A) and Ehsani.

Tang discloses a switched reluctance machine having with a stator core, winding and rotor poles (see figure 1). Also, the reluctance machine has a sensorless system for controlling the machine (see abstract) and that the winding wire may be energize based on the rotor position (column 1, lines 15-24 & column 5, lines 28-32). Moreover, the monitoring may be based on the slope of a waveform (column 15, lines 1-5). Although it is well known in the art for electrical machines such as motors to have a slot fill winding of more than 65% since it is not desirable to have empty spaces, Tang discloses inherently that the winding may have a slot fill greater than 65% (see figure 1).

However, Tang does not disclose that the stator can be made of a plurality of stator segments.

On the other hand, Takeuchi et al discloses for the purpose of purpose of increasing the efficiency of a motor, a machine having a plurality of circumferentially-spaced stator segments 11 with winding 16 and insulation 15 between the stator core plates and the winding 16 (see figure 2). Moreover, the stator segments 11 have a tooth section that extends radially and projections extending radially (see figure 1).

Moreover, Oki teaches for more emphasis for the purpose of making a motor with a superior electromagnetic performance that a reluctance motor may be made by having a segmented stator (see figure 4).

Although it is known in the art that switch reluctance machines operate by controlling the back emf using the induced magnetism by controlling the inductance and resistance of the windings, neither Tang nor Takeuchi et al nor Oki disclose explicitly that by using the inductance and resistance of the stator, a control operation may be performed.

On the other hand, Ehsani discloses for the purpose using a cost effective technique to detect the rotor position of a switch reluctance motor that the difference between varying voltage and current passing through a resistance and

inductance may be use to determine a rotor position (see abstract, figures 1, 3-6, 7 & column 5, lines 25-30).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design a reluctance machine as disclosed by Tang and to modify the invention by forming the stator from a plurality of stator segments for the purpose of purpose of increasing the efficiency of a motor as disclosed by Takeuchi et al and to emphasized a segmented stator for a reluctance motor for the purpose of making a motor with a superior electromagnetic performance as disclosed by Oki and to use the inductance and resistance of a stator for the purpose using a cost effective technique to detect the rotor position of a switch reluctance motor as disclosed by Ehsani.

5. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, Takeuchi et al and Oki and Ehsani as applied to claims 1, 11 and 21 above, and further in view of Moriarty.

The combined electrical machine discloses all of the elements above. However, the combined electrical machine does not disclose that pulses that are outputted to stator segments.

On the other hand, Moriarty discloses for the purpose of reducing the cost of manufacturing of a device a pulse generated that can be supplied to a control circuit and stator segments (see paragraph 0007).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the combined electrical machine as disclosed above and to modify the invention by using a generated pulse discloses for the purpose of reducing the cost of manufacturing of a device that detects the rotor position as disclosed by Moriarty.

6. Claims 4, 5, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, Takeuchi et al and Oki and Ehsani as applied to claims 1 and 11 above, and further in view of Mann et al.

The combined electrical machine discloses all of the elements above. However, the combined electrical machine does not disclose, explicitly that data from a table and the rotor position can be monitored by the slope of waveform.

On the other hand, Mann et al discloses for the purpose of reducing damage done to motors and reducing the cost of manufacture of motor that the motor uses a sensorless system wherein the windings are energized based on a data (see claim 4)

and using the slope of a signal, the position of the rotor can be determined (see claim 6 (i), (j)).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the combined electrical machine as disclosed above and to modify the invention by using the slope of a waveform for determining the rotor position for the purpose of reducing damage done to motors and reducing the cost of manufacture of motor as disclosed by Mann et al.

7. Claims 10, 20 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, Oki and Takeuchi et al and Ehsani as applied to claims 1 and 11 above, and further in view of Akita et al.

The combined electrical machine discloses all of the elements above. However, the combined electrical machine does not disclose end caps with central portions.

On the other hand, Akita et al discloses for the purpose of improving the magnetic performance and increasing the mechanical precision for an iron core assembly that end caps connected being placed at ends of stator segments (see figure 36) and that the stator segments have central portions so as to hold the stator plates together (see figures 49(b), 50).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the combined electrical machine as disclosed above and to modify the invention by using end caps for the purpose of improving the magnetic performance and increasing the mechanical precision for an iron core assembly as disclosed by Akita et al.

#### **Allowable Subject Matter**

8. Claims 3, 13, 9, 19 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to claims 3 and 13, the prior art fails to disclose that the sensorless drive circuit includes a diagnostic pulse generator that generates a diagnostic pulse that is output to the winding wire of one of the stator segment assemblies, wherein the sensorless drive circuit derives the rotor position based on a sensed change in phase current due to the diagnostic pulse.

With respect to claims 9, 19 and 24, the prior art fails to disclose a first and second end caps connected to opposite axial ends of the stator segment core and a first and second end cap retainer sections that extend adjacent to the projections and that connect inner ends of the first and second ends caps wherein the first and



second ends caps and the first and second ends cap retainer sections define an annular retention channel that reduces movement of the winding wire during use and wherein the first and second end caps and the first and second end cap retainer sections are not located between the winding wire and axial side surfaces of the tooth section.

***Response to Arguments***

9. Applicant's arguments filed 08/22/03 have been fully considered but they are not persuasive.

Respectfully, the claims disclosed are not specific enough to differentiate between the present invention and the prior art. For example, the winding method disclosed in the base claims is not specific enough and using a 65% or greater slot fill may be described in many electrical machines since it is not desirable to leave empty spaces in a motor. Also, the description of the sensorless drive circuit is not specific enough to differentiate from the prior art since switch reluctance machines use the back emf in combination with the inductance and the resistance of the stator to derive a rotor position. It is recommended that the sensorless drive circuit be described in the claims so as to differentiate between the prior art and the present invention.

Moreover, Takeuchi et al teaches explicitly that is known to have an occupancy ratio of wires in the stator of 70% (column 3, lines 40-45), which is clearly higher than the one disclose in the base claims of 65%.

Tang and Takeuchi et al disclose a stator for an electric machine. Both references are well in the field of electric machines. Also, Takeuchi et al discloses a specific purpose for making a segmented stator, which is for obtaining “high-density windings and space-saving performance to realize compact and highly efficient motors”. Such improvement (making a segmented stator) is well known in the field of motors, as taught by Takeuchi et al.

Also, Oki shows clearly using a reluctance motor with a segmented stator (see figure 10).

Also, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to come with those optimum ranges (65% or higher) that the applicant discloses, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In *re Aller*, 105 USPQ 233.

Also, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a 65% slot fill, since it has been held that

discovering the optimum value of result effective variable involves only routine skill in the art. *In re Boesch*, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980).

10. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, both of the references deal with electrical machines, especially motors and improvements of such machines.

11. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was

made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

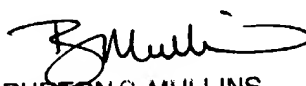
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julio C. Gonzalez whose telephone number is (703) 305-1563. The examiner can normally be reached on M-F (8AM-5PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on (703) 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Jcg

December 9, 2003

  
BURTON S. MULLINS  
PRIMARY EXAMINER